

REMARKS

Claims 1, 3, 5, 6, 8 – 10 and 12 – 16 are now pending in the application. The Examiner is respectfully requested to reconsider and withdraw the rejections in view of the amendments and remarks contained herein.

REJECTION UNDER 35 U.S.C. § 103

Claims 1, 3, 5, 6, 8 – 10 and 12 – 16 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Tamai et al. (U.S. Pat. No. 6,307,277) in view of Bhavsar (U.S. Pat. No. 6,691,807). This rejection is respectfully traversed.

Claim 1 includes monitoring a vehicle speed and activating all of the cylinders when the vehicle speed achieves a threshold. Tamai fails to teach or suggest monitoring a vehicle speed and activating all of the cylinders when the vehicle speed achieves a threshold.

The present invention provides a regenerative braking system with a displacement on demand (DOD) engine in an electric hybrid vehicle. The regenerative braking system generates current to recharge a battery while at least one engine cylinder remains active to provide sufficient drive torque if suddenly required. For example, while the engine is powering the vehicle and braking is initiated by an operator, at least one cylinder is deactivated to reduce engine braking. The regenerative braking system absorbs an increased amount of the vehicle's kinetic energy while at least one cylinder remains active. When the vehicle speed achieves a threshold vehicle speed, all of the cylinders of the engine are activated.

Tamai discloses a fuel management control system for a traditional hybrid vehicle that implements a traditional engine and regenerative braking system (Abstract). Upon deceleration, the fuel management controls fuel on-off transitions of the engine (Col. 2, Lines 38 – 40). Once fuel and spark are cut to all of the cylinders, the engine is kept spinning by a reverse-flywheel torque converter and transmission downshifts are performed with the aid of an electric machine, until the transmission is dropped to neutral (Col. 2, Lines 39 – 49).

Tamai monitors vehicle speed and shuts off fuel flow to the engine in response to vehicle braking ***at vehicle speeds above a predetermined threshold speed***. As specifically disclosed in Figure 5 and the corresponding text (Col. 10, Line 50 – Col. 11, Line 25), the system of Tamai only enables a fuel-off regeneration braking mode at speeds ***above*** a threshold vehicle speed (e.g., 15 – 20 mph) (see the “Regen-Able Range” in Figure 5). At vehicle speeds below this threshold, the system of Tamai only enables coasting without regeneration. Further, Tamai initiates restart of the engine based on an accelerator pedal input (Col. 10, Lines 60 – 64), completely independent of vehicle speed. Accordingly, the cylinder shut-off control of Tamai is opposite to that of the present invention, wherein all of the cylinders are activated when the vehicle speed achieves a threshold vehicle speed.

Applicant further notes that the modification of Tamai with any reference that would disclose activating all the cylinders of an engine when a vehicle speed achieves a threshold vehicle speed would be improper because such a modification would render the prior art invention being unsatisfactory for its intended purpose. Therefore, Tamai

fails to provide the required suggestion or motivation to make the proposed modification (see *In re Gordon*, 733 F.2d 900, 221 USPQ 1125 (Fed. Cir. 1984)).

Besides such a combination being improper, Applicant notes that Bhavsar anyways fails to cure the deficient teachings of Tamai. Bhavsar discloses a hybrid vehicle system that is powered by an electric motor 14 and an engine 16, which provide a total torque output. The hybrid vehicle system of Bhavsar monitors various vehicle operating conditions, including vehicle speed (Col. 5, Lines 13 – 17). A propulsion control 24 calculates the overall torque demand partially based on the vehicle speed and determines the percentage of the overall torque demand that is to be provided by the electric motor 14 and the percentage that is to be provided by the engine 16 (Col. 5, Lines 35 – 47). Bhavsar fails to teach or suggest either comparing a vehicle speed to a threshold vehicle speed or activating all of the cylinders of an engine when the vehicle speed achieves a threshold vehicle speed. Accordingly, even if Bhavsar were to be combined with Tamai, which is improper, Bhavsar fails to cure the deficient teachings of Tamai.

In view of the foregoing, reconsideration and withdrawal of the rejection are respectfully requested.

Each of claims 3, 5 and 6 depend from claim 1, which defines over the prior art, as discussed in detail above. Therefore, claims 3, 5 and 6 also define over the prior art, for at least the reasons discussed with respect to claim 1, and reconsideration and withdrawal of the rejections are respectfully requested.

With regard to claims 8 and 13, Applicant notes that each includes monitoring a vehicle speed and activating all of the cylinders of the engine when the vehicle speed

achieves a threshold vehicle speed. Tamai fails to teach or suggest monitoring a vehicle speed and activating all of the cylinders of the engine when the vehicle speed achieves a threshold vehicle speed. Bhavsar fails to cure the deficient teachings of Tamai.

Applicant incorporates the above discussion with respect to claim 1. As discussed in detail above, the system of Tamai only enable regenerative braking when the vehicle is traveling at a speed above a predetermined threshold, which is opposite to the control of the present invention. Further, Tamai restarts the engine based on a driver accelerator pedal input and not the vehicle speed, as claimed in the present invention.

Applicant reasserts the fact that the combination of Tamai and Bhavsar is improper because the modification would render the system of Tamai unsatisfactory for its intended purpose. Besides the combination being improper, Bhavsar fails to teach or suggest monitoring a vehicle speed and activating all of the cylinders of the engine when the vehicle speed achieves a threshold vehicle speed for the reasons stated above. Accordingly, reconsideration and withdrawal of the rejections are respectfully requested.

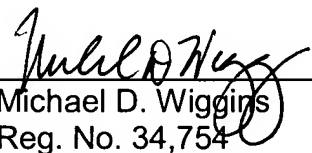
Each of claims 9, 10, 12 and 14 – 16 depend from one of claims 8 and 13, which define over the prior art, as discussed in detail above. Therefore, claims 9, 10, 12 and 14 – 16 also define over the prior art, for at least the reasons discussed with respect to claims 8 and 13, and reconsideration and withdrawal of the rejections are respectfully requested.

CONCLUSION

It is believed that all of the stated grounds of rejection have been properly traversed, accommodated, or rendered moot. Applicant therefore respectfully requests that the Examiner reconsider and withdraw all presently outstanding rejections. It is believed that a full and complete response has been made to the outstanding Office Action, and as such, the present application is in condition for allowance. Thus, prompt and favorable consideration of this amendment is respectfully requested. If the Examiner believes that personal communication will expedite prosecution of this application, the Examiner is invited to telephone the undersigned at (248) 641-1600.

Respectfully submitted,

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